PATENT APPLICATION
Mo-6342
WW-5522

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICATION OF	) GROUP NO.: 1623
HARTWIG SCHLESIGER	)
SERIAL NUMBER: 09/856,545	) EXAMINER: K. GANAPATHY
FILED: MAY 22, 2001	)
TITLE: METHOD FOR THE PRODUCTION OF LOW-VISCOUS WATER-SOLUBLE CELLULOSE ETHERS	)

APPEAL BRIEF

Commissioner for Patents
Alexandria, VA 22313

Sir:

This Appeal Brief, is an appeal from the Final Office Action dated October 21, 2003, in which Claims 1-3, 5, 7-9, and 12-15 were finally rejected.

I. REAL PARTY IN INTEREST

The real party in interest is Assignee Wolff Walsrode AG.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals or interferences which directly or indirectly affect the present appeal.

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office Alexandria, VA, 20231, on the date below.

Jill Denesvich Reg. No. 52,810
Name of Appellant, assignee or Registered Representative

Signature

May 21, 2004
Date

III. STATUS OF CLAIMS

Claims 1-3, 5, 7-9, and 12-15 stand rejected. (Appellant is including a supplemental amendment to cancel claim 13 as suggested by the Examiner, which places the Application in better condition for allowance).

IV. STATUS OF AMENDMENTS

Claims 1-3, 5, 7-9, and 12-15 stand as amended in an Amendment filed on August 11, 2003; however, a Supplemental Amendment has been filed to place the claims in better condition for allowance and cancel Claim 13 as suggestd by the Examiner.

V. SUMMARY OF THE INVENTION

Appellant's invention is directed to a process for the production of low-viscosity water-soluble cellulose ethers by oxidative decomposition of higher-viscosity cellulose ethers. The process is carried out by forming a mixture at 65-125°C comprising higher-viscosity cellulose ethers and aqueous hydrogen peroxide with a hydrogen peroxide content of 0.5-1.8 wt. % relative to dry cellulose ether and a solid content of the mixture being 25 wt. % relative to the total quantity of the mixture. This is followed by agitating the mixture continuously at the said temperature until approximately at least 90% of hydrogen peroxide has been spent; wherein the mixture is agitated continuously at temperatures of 75-100 °C. The pH of the mixture is set at more than 4.5 by adding to said mixture a second aqueous solution which has a pH of 5 to 12, provided that when said second aqueous solution is added during the decomposition reaction said second aqueous solution may optionally contain, in solution, the hydrogen peroxide required for the decomposition reaction.

Appellant's invention provides previously unavailable advantages, as further discussed below. Appellant's invention provides a process which allows the viscosity to be set immediately after washing of the cellulose ether in such a way that the subsequent drying, shaping (grinding, granulation) and mixing are not affected and that the decomposition reaction is not affected by the subsequent process steps drying, shaping (grinding, granulation) and mixing.

This object was achieved in that a higher-viscosity water-soluble cellulose ether as obtained after washing, was mixed with an aqueous solution of hydrogen peroxide, the dry content of the mixture not exceeding 25 wt.% in relation to the total quantity. The mixture is then continuously agitated at temperatures of 65 - 125°C, preferably 75 - 100°C, until the hydrogen peroxide is spent, and then dried.

By this process a low-viscosity water-soluble cellulose ether is obtained. Surprisingly the subsequent process steps for the production of cellulose ethers ready-for-sale, such as drying, shaping (grinding, granulation) and mixing are not affected by the decomposition reaction. The degree of moisture and grinding can be set independently of the reduction in viscosity.

VI. ISSUE

1. Are Claims 1-3, 5, 7-9 and 12-15 obvious under 35 USC 103(a) as being unpatentable over United States Patent No. 5,480,984 (**Angerer et al**) in combination with United States Patent No. 5,708,162 (**Hilbig et al**) and GB 953,944 (**Gill**)?

VII. GROUPING OF CLAIMS

Claims 1-3, 5, 7-9, and 12-15 stand as a single group. Claim 13 has been cancelled so that the Claims are in better condition for allowance.

VIII. ARGUMENTS

Rejection of Claims 1-3, 5, 7-9, and 12-15 Under 35 USC 103

The Examiner rejected Rejection Under 35 USC 103 over United States Patent No. 5,480,984 (Angerer et al) in combination with United States Patent No. 5,708,162 (Hilbig et al), GB 953,944 (Gill) and DE 1543116 (Janocha et al). The rejection should be withdrawn in view of the remarks below.

Appellant respectfully submits that "in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claims limitations. The teachings or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on appellants' disclosure." See MPEP § 2142, citing In re Vaeck, 947 F.2d 488, 20 USPQ 2d. 1438 (Fed. Cir. 1991).

The issue of motivation is properly addressed in terms of one of ordinary skill in the art who has not had access to Applicant's Specification. As set forth by the Federal Circuit in In re Dow Chemical, 5 U.S.P.Q.2d 1529 (Fed. Cir. 1988) "the consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art". The proper standard clearly required by the Federal Circuit is that "both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure". The fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient to establish prima facie obviousness.

Angerer et al

In support of the rejection, the Examiner cited Angerer et al for the proposition that it teaches:

> low viscosity cellulose ethers using hydrogen peroxide at a temperature,<which is within the recited range and also with agitation. The process of Angerer also includes step-by-step addition of hydrogen peroxide with the solids content being above 25%. Angerer also states that there is reduction in viscosity and the process is conducted till more than 90% of hydrogen peroxide is consumed (see col. 2, line 56 to col. 3, line2 and example 1, col. 4). This disclosure of Angerer would convey to one of ordinary skill in the art that the viscosity of cellulose ethers can be lowered from a higher value even though there is no explicit teaching of this fact (Office Action, page 3, para 1).

However, Angerer et al discloses the use of hydrogen peroxide in amounts of

2.57 percent by weight, based on the weight of polysaccharide (Examples 1 and 2: 3.5 kg of 50% hydrogen peroxide per 68 kg of carboxymethylcellulose); and 3.2 percent by weight, based on the weight of polysaccharide (Example 4: 703 g of 50% hydrogen peroxide per 10.9 kg of hydroxyethylcellulose). In fact, Angerer et al, does not, disclose, teach or suggest the process of Appellant's present claims which includes "0.5 to 1.8 wt. % of hydrogen peroxide, based on the dry weight of cellulose ether.

Further, Angerer et al does not disclose, teach or suggest the process of Appellant's present claims in which: during or after the decomposition reaction, the pH value of the mixture of step (a) is set at more than 4.5, by adding (to said mixture) a second aqueous solution having a pH of 5 to 12, provided however that when the second aqueous solution is added during the decomposition reaction the second aqueous solution may optionally contain, in solution, the hydrogen peroxide required for the decomposition reaction.

However, there is no suggest that the there is any basis in Angerer et al which would have led the skilled artisan to modify Angerer et al to the claims. Appellant submits that the record does not point to evidence or practical reason of record, which would have provided a basis for modifying Angerer et al to arrive at Appellant's invention.

Gill

The Examiner indicates that:

> Gill teaches reduction of viscosity of cellulose ethers using hydrogen peroxide in the temperature range 70-100 degree Celsius at a pH of between 5 and 9. Gill also states that it is advantageous to take a high viscosity cellulose ether and reduce its viscosity to the desired value (col. 1, lines 37-40). Gill's teaching shows that the reduction in viscosity can be carried out at a wider range of temperature. Gill is cited for the proposition that it teaches (see entire document) reduction of viscosity of water-soluble cellulose ethers using aqueous hydrogen peroxide in the temperature range 70-100 °C (see table 1, page 3 and examples) at a pH of between 5 and 9 (see claim 8, page 4). (Office Action, page 3, para 2).

However, Gill discloses a process for reducing the viscosity of water-soluble non-ionic cellulose ethers by treatment with hydrogen peroxide (page 1, lines 9-13

and lines 44-56). Gill discloses the use of hydrogen peroxide in amounts ranging from 3 to 16.6 percent by weight, based on the weight of cellulose ether (Examples 1-13). For purposes of illustration, the recited range of hydrogen peroxide amounts was calculated as follows, using Example 1 on page 2 of Gill: 1 part of 30% H_2O_2 (i.e., 0.3 parts H_2O_2) per 7.5 parts of hydroxypropyl methyl cellulose = 4 percent by weight of H_2O_2, based on the weight of hydroxypropyl methyl cellulose.

Gill does not disclose, teach or suggest the process of Appellant;s present claims which employs 0.5 to 1.8 wt. % of hydrogen peroxide, based on the dry weight of cellulose ether. Further, Gill does not disclose, teach or suggest the process of Appellant's present claims in which: during or after the decomposition reaction, the pH value of the mixture of step (a) is set at more than 4.5, by adding (to said mixture) a second aqueous solution having a pH of 5 to 12, provided however that when the second aqueous solution is added during the decomposition reaction the second aqueous solution may optionally contain, in solution, the hydrogen peroxide required for the decomposition reaction.

Hilbig

The Examiner alleges that:

> Even though Hilbig uses perborate as the oxidizing agent in his process, he also shows a comparison ofthe process using perborate and hydrogen peroxide (Table 1 and Table 3). The reduction in viscosity in both cases is comparable even though they are not exactly the same. Hilbig also discloses that the process using hydrogen peroxide is advantageously carried out at an alkaline pH (col. 2, lines 13-15) (Office Action, page 3, para 3).

Appellant traverses the rejection based on Hilbig et al on the grounds it is apparently based on unsupported general knowledge. It is well settled in the law that when a rejection is based on facts within the personal knowledge of the Examiner, data should be provided as specifically as possible, and the facts must be supported when called for by Applicant, In re Lee, 61 USPQ 1430 (CAFC2000). In this case, Appellant is unaware of using perborate as an oxidizing agent in accordance with the claimed invention to achieve the same results as hydrogen peroxide.

Further, Hilbig et al disclose a process for the preparation of low molecular

weight polysaccharide ethers by means of oxidative degradation with perborate (abstract). On page 5 of the Office Action of 13 August 2002 it stated that even though Hilbig et al uses perborate as the oxidizing agent, the same result can be achieved with hydrogen peroxide. Appellant respectfully disagrees. Hilbig et al explicitly **teach away** from the use of hydrogen peroxide as an oxidizing agent in their process (column 2, lines 45-51). As Hilbig et al teach away from the use of hydrogen peroxide in the preparation of low molecular weight polysaccharide ethers, the requisite motivation to combine their disclosure with Angerer et al, Gill or Janocha is not present.

Further, in Table 1, Hilbig et al disclose the use of H_2O_2 in amounts of 1.43 to 4.76 percent, based on CMC (columns 16 and 17). However, Hilbig et al do not disclose, teach or suggest performing the process of Appellant's present claims, which includes "using 0.5 to 1.8 wt. % of hydrogen peroxide, based on the dry weight of cellulose ether."

Janocha

The Examiner alleges that:

> Janocha teaches a process for production oflow-viscosity cellulose ethers by oxidation of high viscosity cellulose ethers with hydrogen peroxide, the process being characterized by intense mixing and the peroxide concentration being 0.1 to 10 weight percent with respect to the dry substance (see page 4, lines 1-10 of English translation). Janocha also discloses the fact that acidic products are produced during decomposition and hence it is advantageous to neutralize the mixture by adding sodium carbonate or sodium hydroxide (see page 5, line 13 through page 6, line2). The process can also be run only till just 5% of hydrogen peroxide remains and the resulting product can be sold without having to remove excess hydrogen peroxide (see page 5 second paragraph). This is an advantage since it cuts down on the process time especially in a manufacturing process (Office Action, page 3, para 4, to page 4, para 1)).

Appellant traverses the rejection over Janocha et al because the record does not point evidence or practical reason of record for the proposed modification with a reasonable expectation of success, In re Fine 5 USPQ 1596 (Fed. Cir. 1988). The fact that one of ordinary skill in the art can modify the prior art does not render the prior art obvious, absent some basis in the art for making the modification.

In particular, Janocha et al is direct to claims a process for the production of low-viscosity cellulose ethers by oxidative decomposition of higher-viscosity cellulose ethers with hydrogen peroxide. This process is characterized in that, a higher-viscosity cellulose ether is mixed with an aqueous solution of hydrogen peroxide, the water content of the mixture not exceeding 75 wt.% in relation to the total quantity. The mixture is then dried at temperatures of 100°C to 250°C until the hydrogen peroxide is spent. Here, the loss of moisture and of hydrogen peroxide run virtually in parallel with the reduction in viscosity.

Further, the Examiner alleges that based on the teachings cited one of ordinary skill in the art can see that:

> low viscosity cellulose ethers can be produced from high viscosity cellulose ethers via a process as instantly claimed is indeed prima facie obvious. The advantage of combining the teachings of the art cited above includes:
>
> 1. Gill teaches the advantage of starting with a high viscosity celllose ether and reducing the viscosity via oxidation and also conducting the process at a pH of 5-9.
>
> 2. Both Gill and Angerer teach the production of low viscosity cellulose ethers at a higher temperature whereby process times are lowered.
>
> 3. Janocha teaches preparation of low viscosity of cellulose ethers wherein the percentage of peroxide used is 0.1 to 10% and uses alkali salts to control the pH to neutral.
>
> It would be advantageous to combine the teachings of the prior art to produce low viscosity cellulose ethers starting from high viscosity cellulose ethers as instantly claimed because of the advantage as disclosed by Gill. Moreover, performing the process at a neutral or alkaline pH and at a higher temperature reduces the process time and reduces acidic impurities. Since Angerer discloses (col. 2, lines 46-49) that hydrogen peroxide when used at a considerable proportion decomposes and is inactive, it is advantageous to use lower concentrations (as seen in Janocha) to minimize decomposition. Any unreacted hydrogen peroxide will also be minimal and need not be removed according to Janocha.
>
> Hence a process as instantly claimed is obvious from the teachings of the prior art and is also highly economical when combined (Office Action, page 4, para 2 to page 5 para 1).

However, as discussed, both Gill, Angerer, (and Hilbig et al) do not suggest or teach Appellant's invention including "using 0.5 to 1.8 wt. % of hydrogen peroxide, based on the dry weight of cellulose ether." Further, Angerer et al teaches that the

amount of hydrogen peroxide required for depolymerization has been found to varying according to the polysaccharide (Col. 2, line 67 to Col. 3, line 2). Thus, there is no teaching or suggestion that one can modify the amounts of hydrogen perioxide in Angerer et al to lower concentrations, including concentrations disclosed by Janocha et al, and arrive at Appellant's invention.

Accordingly, one of ordinary skill in the art would not have been motivated by the cited prior art to modify the cited art, practice or make Appellant's invention, and expect the results Appellant has obtained.

IX. CONCLUSION

In view of the remarks above, a Notice of Allowance is earnestly requested.

Respectfully submitted,

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APPENDIX: CLAIMS ON APPEAL

Please cancel claim 13.

1. (Previously Present) A process for the production of low-viscosity water-soluble cellulose ethers by oxidative decomposition of higher-viscosity cellulose ethers with hydrogen peroxide, comprising:

(a) forming, under conditions of intensive mixing and at temperatures of 65 - 125°C, a mixture comprising, (i) higher-viscosity cellulose ethers, and (ii) an aqueous solution of hydrogen peroxide which is present in an amount of 0.5 to 1.8 wt.% in relation to the dry cellulose ether, the solid content of the mixture is no lower than 25 wt.% in relation to the total quantity of the mixture; and

(b) agitating continuously the mixture of step (a) at temperatures of 65 - 125°C until approximately at least 90% of the hydrogen peroxide has been spent,

wherein during or after the decomposition reaction, the pH value of the mixture of step (a) is set at more than 4.5, by adding to said mixture a second aqueous solution which has a pH of 5 to 12, provided that when said second aqueous solution is added during the decomposition reaction said second aqueous solution may optionally contain, in solution, the hydrogen peroxide required for the decomposition reaction.

2. (Previously Presented) The process of Claim 1 wherein said mixture of step (a) is formed by adding aqueous hydrogen peroxide in portions.

3-4. (Cancelled)

5. (Twice Amended, Clean) The process of Claim 1 wherein a higher-viscosity cellulose ether having a dry cellulose ether content of 35 - 80 wt.%, in relation to the total quantity of cellulose ether and solvent, is used.

6. (Cancelled)

7. (Original) Process for the production of low-viscosity water-soluble cellulose ethers according to any one of claims 1 to 6, characterised in that the water soluble cellulose ether is carboxymethyl cellulose, hydrophobically modified carboxymethyl cellulose, hydroxyethyl carboxymethyl cellulose, sulfoethyl cellulose, hydrophobically modified sulfoethyl cellulose, hydroxyethyl sulfoethyl cellulose, hydrophobically modified hydroxyethyl sulfoethyl cellulose, hydroxyethyl cellulose, hydrophobically modified hydroxyethyl cellulose, methyl cellulose, methylhydroxyethyl cellulose, methylhydroxyethyl sulfoethyl cellulose, hydrophobically modified methylhydroxyethyl cellulose, methylhydroxypropyl cellulose, hydroxypropyl cellulose or mixtures thereof.

8. (Original) Process for the production of low-viscosity water-soluble cellulose ethers according to any one of claims 1 to 7, characterised in that the water-soluble cellulose ether is methylcellulose, methyl hydroxyethyl cellulose, hydrophobically modified methyl hydroxyethyl cellulose, methyl hydroxypropyl cellulose, hydroxypropyl cellulose or mixtures thereof and water-wet filter cakes of these cellulose ethers, as obtained after washing and separation, are used.

9. (Original) Process for the production of low-viscosity water-soluble cellulose ethers according to any one of claims 1 to 7, characterised in that the water soluble cellulose ether is methyl hydroxyethyl cellulose or methyl hydroxypropyl cellulose and water-wet filter cakes of the cellulose ethers, as obtained after washing and separation, are used.

10-11. (Cancelled)

12. (Previously Amended) The process of Claim 1 wherein a higher-viscosity cellulose ether having a dry cellulose ether content of 40 to 55 wt. %, in relation to the total quantity of cellulose ether and solvent, is used.

13. (Cancelled)

14. (Previously Presented) The process of Claim 1 wherein the pH value of the mixture of step (a) is set at 6 to 7.

15. (Previously Presented) The process of Claim 1 wherein said second aqueous solution comprises a member selected from the group consisting of sodium dihydrogen phosphate, sodium hydrogen phosphate, sodium phosphate, sodium carbonate, sodium hydrogen carbonate, alkali salts of citric acid, alkali salts of succinic acid and combinations thereof.